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Efficiency and criticality of the elements belonging to a complex territorial system subject to natural hazards

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A territorial system can be modeled as a complex set of elements or sub-systems. These elements usually have different and dedicated functions, and they may be functionally interconnected among them.

In this work, such elements and their dependences are represented through the use of a graph-based formalization. The aim is that of evaluating the so-called "systemic" vulnerability, through the use of two different variables characterizing each element of the territorial system, namely the criticality and the efficiency. Focusing the attention to the temporal phases corresponding to the occurrence of a calamitous event, the first one measures the service demand of an element, whereas the efficiency measures the service that can be offered by such an element.

In order to show correctly the characteristics and the potentialities of the proposed model, a case study pertaining to the hydrological risk in the *Val di Vara* area (Italy) is presented.